Fall 2020

CHEM 661-101: Instrumentation Analysis Lab

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

Chemistry:

CHEM 661 - Instrumentation Analysis Lab

Fall 2020 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: The objective of this course is to provide an overview of instrumental techniques used in analysis of different analytes. Many physically/chemically different analytes are encountered in different sample matrices, such as, solids, liquids and gases. Different sample preparation techniques and analytical instrumentation are needed for analyzing these species. It will not be possible to cover the whole spectrum of analytical techniques. The focus of this class will be on instrumentation for chromatography and spectroscopy.

Number of Credits: 3

Prerequisites: One year of undergraduate physical chemistry

Course-Section and Instructors

Course-Section	Instructor
CHEM 661- 101	Dr. Chaudhery Mustansar Hussain 973-596-3587 chaudhery.m.hussain@njit.edu **Office**: Tiernan Hall 151D

Class/Laboratory time: **Laboratory Portion: Tuesday 06:00 PM - 09:10 PM, Tiernan Hall Room 205 (25% In person)**

Online:

Lectures & Laboratory sessions will happen at the scheduled time, via Webex at the following address: https://njit.webex.com/meet/hussainnjit.edu or 927 520445. They will also be recorded and posted on Canvas afterwards.

Office Hours: **With an appointment**

Please send an email to schedule an appointment.

If you need assistance and wish to discuss with your instructor, please email to schedule a Webex meeting. I will be more than happy to help.

E-Mail: All E-mail to me should start with CHEM 661 in the subject so that it can be filtered appropriately. Any e-mail pertaining to your academic standing (i.e., grades) must be sent from your NJIT account. Anonymous e-mail will not be read.

Lab manual is required. CHEM 661- Instrumentation Analysis Lab Manual, available from the Department of Chemistry and Environmental Science main office (Tiernan 151) for $20.

Required Textbook:

Title	Principles of Instrumental Analysis
Author	Douglas A. Skoog, F. James Holler, Stanley R. Crouch
Edition	7 edition (January 1, 2017)
Publisher	Cengage Learning
ISBN #	9781305577213

Then lecture notes will also be uploaded/provided.

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, November 09, 2020. It will be strictly enforced.

Learning Outcomes:

By the end of the course, you should be able to do the following:

1. Understand the basics of analytical chemistry and the figures of merit for the analytical instruments.
2. Have learnt the theory of chromatographic separation
3. Apply these concepts to know about the design of gas chromatographic instruments.
4. Have learnt about the instrumentation of liquid chromatography as applied to semi volatile organics.
5. Acquired the concepts of mass spectrometry and the detailed instrumentation for this technique.
6. Have learnt the fundamentals of spectroscopic analysis
7. Have applied these concepts in molecular spectroscopy through the use of UV visible spectroscopy.
8. Have learnt about the analysis of metals by atomic spectroscopy.
9. Have had hands on experimental experience using UV-Vis, GC, HPLC and AA.

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:
One-midterm exam and laboratory reports. 50% exams and 50% lab portion. All exams will be closed book. NJIT honor code will be withheld. Violations will be brought to the immediate attention of Dean of Students.

Details of Grading Policy: The final grade in this course will be determined as follows:

Lecture grades-Midterm	50%
Lab grades	
Attendance and Safety and cleanliness	5%
Quizzes	15%
Laboratory reports	20%
Oral presentation-group	10%
Total	100%

Your final letter grade in this course will be based on the following tentative curve:

A	90-100	**C**	70-75
B+	86-89	**D**	60-69
B	80-85	**F**	<60
C+	76-79		

Attendance Policy: Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes."

Homework Policy: Homework is an expectation of the course. The homework problems set by the instructor are to be handed in for grading and will be used in the determination of the final letter grade as described above.

Exams: There will be one midterm exams held in class during the semester and three quizzes during lab portions. The following exam periods are tentative and therefore possibly subject to change:

Midterm Exam I	After Seven Lectures
Quizzes	During Lab Part
Final Exam Period	December 15 – December 21

The final exam will test your knowledge of all the course material taught in the entire course.

Makeup Exam Policy: There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed so that appropriate steps can be taken to make up the grade.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

ADDITIONAL RESOURCES

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Rm. G12. Hours of operation are Monday – Friday 10:00 am - 6:00 pm. For further information please click here.

Accommodation of Disabilities: Office of Accessibility Resources and Services (***formerly known as Disability Support Services***) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- http://www5.njit.edu/studentsuccess/disability-support-services/

Important Dates See: Fall 2020 Academic Calendar, Registrar
https://www5.njit.edu/registrar/fall-2020-academic-calendar/

Date	Day	Event
September 1	T	First Day of Classes
September 5	S	Saturday Classes Begin

September 7	M	Labor Day
September 8	T	Monday Classes Meet Last Day to Add/Drop a Class Last Day for 100% Refund, Full or Partial Withdrawal
September 9	W	W Grades Posted for Course Withdrawals
September 14	M	Last Day for 90% Refund, Full or Partial Withdrawal No Refund for Partial Withdrawal after this date
September 28	M	Last Day for 50% Refund, Full Withdrawal
October 19	M	Last Day for 25% Refund, Full Withdrawal
November 9	M	Last Day to Withdraw
November 25	W	Friday Classes Meet
November 26	R	Thanksgiving Recess Begins
November 29	Su	Thanksgiving Recess Ends
December 10	R	Last Day of Classes
December 11	F	Reading Day 1
December 14	M	Reading Day 2
December 15	T	Final Exams Begin
December 21	M	Final Exams End
December 23	W	Final Grades Due

Course Outline

Lec	Topic	Assignment
1	Introduction to analytical instrumentation	
2	Fundamentals of spectroscopy.	
3	UV-Vis Molecular absorption	
4	Atomic spectroscopy for measurement of metals	
5	Gas Chromatography	
6	HPLC	
7	Mass spec	
8	Laboratory Experiments (will be updated after midterm schedule)	

The shift to remote and converged teaching due to the COVID-19 pandemic

The shift to remote and converged teaching due to the COVID-19 pandemic has required that both instructors and students make changes to their normal working protocols for courses. Students are asked to practice extra care and attention in regard to academic honesty, with the understanding that all cases of plagiarism, cheating, multiple submission, and unauthorized collaboration are subject to penalty. Students must properly cite and attribute all sources used for papers and assignments. Students may not collaborate on exams or assignments, directly or through virtual consultation, unless the instructor gives specific permission to do so. Posting an exam, assignment, or answers to them on an online forum (before, during, or after the due date), in addition to consulting posted materials, constitutes a violation of the university's Honesty policy. Likewise, unauthorized use of live assistance websites, including seeking "expert" help for specific questions during an exam, can be construed as a violation of the honesty policy. All students should be familiar with the **NJIT Academic Integrity Code:**